

AI-Powered Canning Quality Assessment for Dry Bean Breeding

The [Dry Bean Breeding & Computational Biology](#) Lab at the University of Guelph in collaboration with the Department of Food Science, is excited to announce a PhD graduate research assistantship position in the field of artificial intelligence (AI) and computational biology, with a focus on enhancing canning quality assessment in dry beans. This project offers a unique opportunity for a highly motivated individual to contribute to a transformative research initiative aimed at revolutionizing dry bean breeding in Ontario by integrating AI-driven quality evaluations into early-stage varietal development.

Department: Plant Agriculture, Ontario Agricultural College (OAC), University of Guelph

In collaboration with: Department of Food Science, University of Guelph

Start Date: Fall 2025

Number of positions: 1

Position Overview:

Canning quality is a critical factor for dry bean variety registration in Ontario, yet the absence of local canning research facilities has historically delayed quality assessments, limiting the development of high-yield, high-quality cultivars. This project seeks to establish an AI-based canning quality assessment pipeline at the University of Guelph, enabling early-stage evaluations of dry bean lines for both yield and quality. By leveraging advanced imaging, deep learning algorithms, and sensory analysis, the research will optimize breeding processes, reduce reliance on external facilities, and develop superior bean varieties that meet market demands. The PhD candidate will play a pivotal role in developing and validating AI models to predict canning quality, integrating agronomic, imaging, and lab data to enhance breeding efficiency and sustainability.



Key Responsibilities:

- Develop and optimize deep learning algorithms (e.g., convolutional neural networks, recurrent neural networks) to predict canning quality based on seed imaging and sensory rankings.
- Collect and preprocess high-quality datasets, including spectral and regular imaging of dry bean seeds, agronomic data, and lab-based canning quality metrics.
- Collaborate with the Department of Food Science to standardize canning protocols and sensory analysis, including training and coordinating an advisory panel for sensory evaluations.
- Integrate multi-dimensional datasets (agronomic, imaging, lab, sensory) to identify key features influencing canning quality using feature importance methods.
- Assist in field trials, including data collection on disease resistance and agronomic traits, to support the selection of top-performing bean lines.
- Prepare research findings for publication in peer-reviewed journals, present results at national and international conferences (e.g., Bean Improvement Cooperative Meeting), and contribute to knowledge dissemination through workshops and field days.
- Engage with industry partners, growers, and the Ontario Pulse Crop Committee to ensure alignment with registration requirements and market needs.

Qualifications:

- Master's degree in Plant science, Food Science, Computational Biology, Bioinformatics, or a closely related field.
- Demonstrated experience or strong interest in artificial intelligence, with familiarity in image analysis or computer vision preferred.
- Proficiency in programming languages (e.g., Python, R) and experience with deep learning frameworks (e.g., TensorFlow, PyTorch) is an asset.
- Knowledge of or interest in plant and food science, particularly in relation to quality assessment or sensory analysis.
- Strong statistical and analytical skills, with the ability to handle large, multi-dimensional datasets and perform robust data preprocessing.
- Excellent written and oral communication skills, with a commitment to producing high-quality publications and engaging with diverse stakeholders.
- Ability to work independently and collaboratively in an interdisciplinary environment, including with researchers, industry partners, and growers.

Application Process:

Interested candidates should email the following documents to myoosefz@uoguelph.ca with the subject line "**AI Canning Quality PhD – YOUR NAME**":

- Cover letter (specify interest in “AI-Powered Canning Quality Assessment for Dry Bean Breeding” and detail relevant experience and research interests)
- Curriculum vitae (CV)
- Contact details for three references
- Optional: Sample of relevant work (e.g., code repository, publication, or technical report)

The University of Guelph acknowledges that we reside on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We offer our respect to our Anishinaabe, Haudenosaunee, and Métis neighbors as we continue to strengthen our relationships.

The University of Guelph is committed to equity, diversity, and inclusion and strongly encourages applicants from underrepresented groups to apply. We look forward to welcoming an enthusiastic and dedicated candidate to join our research team and contribute to impactful advancements in dry bean breeding and Ontario’s agri-food sector!